Amendments to the Claims

The following Listing of Claims replaces all prior listings, and versions, of claims in the present application.

Listing of Claims:1. (Currently amended) An analyzer for packet data traffic transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising:

a packet data separator ~~provided between one of a mobile communication exchange and a packet controller~~ that ~~provide~~ facilitates providing a wireless data service to the subscriber~~, and~~ by the service server, ~~for~~ wherein the packet data separator is configured to:

separating separate user packet data transmitted between:

one of the a mobile communication exchange and or the packet controller, and

the service server, and

receiving receive the user packet data after an RP registration is provided;

a traffic analyzer for separating the user packet data received through the packet data separator according to transmission directions, and analyzing the user packet data;

a statistics storage unit for storing and managing result data analyzed by the traffic analyzer[[ ]]; and

a statistics reference unit for retrieving various data stored in the statistics storage unit, and providing statistical information desired by the ~~user~~ subscriber.

2. (Currently amended) The analyzer of claim 1, wherein the packet data separator ~~is accessed to an~~ has Ethernet access ~~between one of the~~ with the service server and with the mobile communication exchange ~~and~~ or the packet controller ~~and the service server~~, and separates the user packet data into transmit data and receive data~~, and receives them~~.

3. (Currently amended) The analyzer of claim 1, wherein the traffic analyzer separates the user packet data received through the packet data separator into transmit data and receive data, and analyzes ~~them~~ the transmit data and the receive data.

4. (Currently amended) The analyzer of claim 3, wherein the traffic analyzer analyzes a TCP (transmission control protocol) transmission flow between the service server and one of the mobile communication exchange and or the packet controller and the service server through the user packet data.

5. (Currently amended) The analyzer of claim 1, wherein the statistics reference unit provides various real-time statistics data analyzed by the traffic analyzer to the user subscriber through a GUI (graphical user interface).

6. (Currently amended) The analyzer of claim 5, wherein the various real-time statistics data include statistics on communication amounts of receive data, transmit data, and receive + transmit receive and transmit data, access trials for each layer, a number of success times, a number of failure times, and current states, and further include usage statistics for each IP on each application, successful access rate statistics for each service, statistics on response times, and successful rate statistics on a PPP session for each base station.

7. (Currently amended) The analyzer of claim 1, wherein a switching hub for transmitting packets to an appropriate port based [[in]] on a packet address, and a router for connecting separated networks that use the same transmission protocol, are connected between the packet data separator and the service server.

8. (Currently amended) A method for analyzing packet data traffic transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising :

(a) receiving and separating user packet data transmitted between one of the a mobile communication exchange and or a the packet controller that provide facilitates providing a wireless data service to the subscriber, wherein the receiving and separating occurs after an RP registration is provided and the service server, and receiving the user packet data;

(b) separating the user packet data received in (a) according to transmission directions, and analyzing the user packet data; and

(c) providing statistical information desired by the ~~user~~ subscriber by using result data analyzed in (b).

9. (Currently amended) The method of claim 8, wherein (a) comprises:

separating the user packet data into transmit data and receive data, and receiving ~~them~~ ~~through an access to an~~ the user packet data via Ethernet access between the service server and ~~one of~~ the mobile communication exchange ~~and~~ or the packet controller ~~and the service server~~.

10. (Currently amended) The method of claim 8, wherein (b) comprises:

separating the received user packet data into transmit data and receive data, and analyzing ~~them~~ the transmit data and the receive data.

11. (Currently amended) The method of claim 10, wherein a TCP transmission flow between ~~one of~~ the service server and the mobile communication exchange ~~and~~ or the packet controller ~~and the service server~~ is analyzed through the user packet data.

12. (Currently amended) A device for monitoring a service for a subscriber through an analysis of packet data traffic transmitted between the subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising:

a packet data separator ~~provided between one of a mobile communication exchange and a packet controller~~ that ~~provide~~ facilitates providing a wireless data service to the subscriber~~, and~~ by the service server, ~~for~~ wherein the packet data separator is configured to:

~~separating~~ separate user packet data transmitted between:

~~one of the~~ a mobile communication exchange ~~and~~ or the packet controller, and

the service server, and

~~receiving~~ receive the user packet data after an RP registration is provided;

a traffic analyzer for separating the user packet data received through the packet data separator according to transmission directions, and analyzing the user packet data;

a statistics storage unit for storing and managing result data analyzed by the traffic analyzer[[ ]]; and

a service monitoring unit for generating information including normality states on the subscriber for each service through various data stored in the statistics storage unit, and providing the information to a manager.

13. (Currently amended) The device of claim 12, wherein the packet data separator is accessed to an Ethernet access between one of the with the service server and with the mobile communication exchange and or the packet controller and the service server, and separates the user packet data into transmit data and receive data, and receives them.

14. (Currently amended) The device of claim 12, wherein the traffic analyzer separates the user packet data received through the packet data separator into transmit data and receive data, and analyzes them the transmit data and the receive data.

15. (Currently amended) The device of claim 12, wherein the traffic analyzer analyzes a TCP (transmission control protocol) transmission flow between the service server and one of the mobile communication exchange and or the packet controller and the service server through the user packet data.

16. (Original) The device of claim 12, wherein the information including normality states on the subscriber for each service is generated by referring to statistical data on a number of trials and a number of success events separated by each service option, and statistics data on a number of service trials and a number of success events by TCP port numbers periodically or in real-time according to a request by the mobile communication network management service provider.

17. (Currently amended) The method device of claim 12, wherein a switching hub for transmitting packets to an appropriate port based [[in]] on a packet address, and a router for connecting separated networks that use the same transmission protocol are connected between the packet data separator and the service server.

18. (Currently amended) A method for monitoring a service for a subscriber through an analysis of packet data traffic transmitted between the subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising:

(a) <u>receiving and</u> separating user packet data transmitted between ~~one of the~~ <u>a</u> mobile communication exchange ~~and~~ <u>or a</u> the packet controller that ~~provide~~ <u>facilitates providing</u> a wireless data service to the subscriber, and the service server, <u>wherein the receiving and separating occurs after an RP registration is provided</u> ~~and receiving the user packet data~~;

(b) separating the user packet data received in (a) according to transmission directions, and analyzing the user packet data; and

(c) generating information including normality states on the subscriber for each service through result data analyzed in (b), and providing the information to a manager.

19. (Currently amended) The method of claim 18, wherein (a) comprises:

separating the user packet data into transmit data and receive data, and receiving ~~them through an access to an~~ <u>the user packet data via</u> Ethernet access between <u>the service server and</u> ~~one of~~ the mobile communication exchange ~~and~~ <u>or</u> the packet controller ~~and the service server~~.

20. (Currently amended) The method of claim 18, wherein (b) comprises:

separating the received user packet data into transmit data and receive data, and analyzing ~~them~~ <u>the transmit data and the receive data</u>.

21. (Currently amended) The method of claim 20, wherein a TCP transmission flow between ~~one of~~ <u>the service server and</u> the mobile communication exchange ~~and~~ <u>or</u> the packet controller ~~and the service server~~ is analyzed through the user packet data.

22. (Withdrawn) A device for monitoring a network based on a protocol analysis through packet data traffic transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising: a first packet data separator provided between a packet controller for providing a

wireless data service for the subscriber and a network linking device for allowing a wireless data service to the service server through the packet controller, for separating user packet data transmitted between the packet controller and the network linking device, and receiving the user packet data; a second packet data separator provided between the network linking device and the service server, for separating user packet data transmitted between the network linking device and the service server, and receiving the user packet data; a first protocol analyzer for analyzing a protocol based on the user packet data received through the first packet data separator; a second protocol analyzer for analyzing a protocol based on the user packet data received through the second packet data separator; a statistics storage unit for storing and managing result data respectively analyzed by the first and second protocol analyzers ; and a network monitoring unit for generating information including normality states on the network relating to the mobile communication network through various data stored in the statistics storage unit, and providing the information to a manager.

23. (Withdrawn) The device of claim 22, wherein the first packet data separator is accessed to an Ethernet access between the packet controller and the network linking device, and separates user packet data into transmit data and receive data, and receives them, and the second packet data separator is accessed to an Ethernet access between the network linking device and the service server, and separates user packet data into transmit data and receive data, and receives them.

24. (Withdrawn) The device of claim 22, wherein the first protocol analyzer separates a protocol structure into a transmit structure and a receive structure according to user packet data received by the first packet data separator, and the second protocol analyzer separates a protocol structure into a transmit structure and a receive structure according to user packet data received by the second packet data separator.

25. (Withdrawn) The device of claim 22, wherein the first protocol analyzer analyzes RP registration and an authentication flow between the packet controller and the network linking device, and PPP (point-to-point protocol) data link setting, and a PPP IP allocation flow through the user packet data, and the second protocol analyzer analyzes a TCP transmission flow between the network linking device and the service server through the user packet data.

26. (Withdrawn) The device of claim 22, wherein the data stored in the statistics storage unit include protocol access statistics for each base station, protocol access statistics for each network linking device, statistics for each protocol failure factor, PPP access statistics for each base station, PPP access statistics for each network linking device, and protocol message statistics.

27. (Withdrawn) The method of claim 22, wherein a switching hub for transmitting packets to an appropriate port based in a packet address, and a router for connecting separated networks that use the same transmission protocol are connected between the second packet data separator and the service server.

28. (Withdrawn) A method for monitoring a network based on a protocol analysis through packet data traffic transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising: (a) respectively separating user packet data transmitted between a packet controller for providing a wireless data service for the subscriber and a network linking device for allowing a wireless data service to the service server through the packet controller, and user packet data transmitted between the packet controller and the service server, and receiving the user packet data; (b) analyzing a protocol based on the respective user packet data received in (a); and (c) generating information including normality states on the network relating to the mobile communication network through result data analyzed in (b), and providing the information to a manager.

29. (Withdrawn) The method of claim 28, wherein user packet data is separated into transmit data and receive data, and they are then received through an access to an Ethernet access between the packet controller and the network linking device, and user packet data is separated into transmit data and receive data, and they are then received through an access to an Ethernet access between the network linking device and the service server.

30. (Withdrawn) The method of claim 28, wherein (b) comprises separating a protocol structure into a transmit one and a receive one according to the user packet data received in (b), and analyzing them.

31. (Withdrawn) The method of claim 30, wherein RP registration and an authentication flow between the packet controller and the network linking device, and PPP (point-to-point protocol) data link setting, and a PPP IP allocation flow are analyzed through the user packet data, and a TCP transmission flow between the network linking device and the service server is analyzed through the user packet data.

32. (Withdrawn) A device for generating billing information for each data service based on an analysis of packet data transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising: a packet separator provided between one of a mobile communication exchange and a packet controller that provide a wireless data service to the subscriber, and the service server, for separating user packet data transmitted between one of the mobile communication exchange and the packet controller and the service server, and receiving the user packet data; a packet analyzer for finding service information used by the subscriber received through an analysis of the user packet data received through the packet separator, and outputting the service information as first billing information; and a billing information storage unit for combining the first billing information output by the packet analyzer and second billing information provided by the mobile communication exchange or the packet controller to store the combined information as single per-service billing information, and transmitting the subscriber's billing information which includes the per-service billing information to a specific billing process system so as to bill the subscriber.

33. (Withdrawn) The device of claim 32, wherein the packet separator is accessed to an Ethernet access between one of the mobile communication exchange and the packet controller and the service server, and separates user packet data into transmit data and receive data and receives them.

34. (Withdrawn) The device of claim 32, wherein the packet analyzer uses the user packet data received through the packet separator to find information including a destination IP and a port number for each subscriber, and uses packet data used by the subscriber to find the subscriber's service usage information.

35. (Withdrawn) A method for generating billing information for each data service based on an analysis of packet data transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising: (a) separating user packet data transmitted between one of a mobile communication exchange and a packet controller and the service server, and receiving the user packet data; (b) finding service information used by the subscriber received through an analysis of the user packet data received in (a), and outputting the service information as first billing information; and (c) combining the first billing information output in (b) and second billing information provided by the mobile communication exchange or the packet controller to store the combined information as single per-service billing information; and (d) transmitting the subscriber's billing information which includes the per-service billing information to a specific billing process system so as to bill the subscriber.

36. (Withdrawn) The method of claim 35, wherein (a) comprises separating the user packet data into transmit data and receive data and receiving them through an access to an Ethernet access between one of the mobile communication exchange and the packet controller and the service server.

37. (Withdrawn) The method of claim 35, wherein (b) comprises finding information including a destination IP and a port number for each subscriber through an analysis of the user packet data, and finding the subscriber's service usage information by using the packet data used by the subscriber.

38. (Withdrawn) A device for generating billing information for each data service based on an analysis of packet data transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising: a packet analyzer for receiving user packet data transmitted between one of a mobile communication exchange and a packet controller and the service server, finding service information used by the subscriber through an analysis of the received user packet data, and outputting the service information as first billing information, the user packet data being reproduced by a packet repeater through a port mirroring method, the packet repeater repeating the packet data transmitted between one of the mobile communication

exchange and the packet controller and the service server, and the mobile communication exchange and the packet controller providing a wireless data service to the subscriber; and a billing information storage unit for combining the first billing information output by the packet analyzer and second billing information provided by the mobile communication exchange or the packet controller to store the combined information as single per-service billing information, and transmitting the subscriber's billing information which includes the per-service billing information to a specific billing process system so as to bill the subscriber.

39. (Withdrawn) The device of claim 38, wherein the packet analyzer uses the user packet data reproduced and received by the packet repeater to find information including a destination IP and a port number for each subscriber, and uses packet data used by the subscriber to find the subscriber's service usage information.

40. (Withdrawn) The device of claim 38, wherein the packet repeater is a switching hub for transmitting packets to an appropriate port based on a packet address.

41. (Withdrawn) The device of claim 38, wherein the packet repeater is a router for connecting separated networks that use the same transmission protocol.

42. (Withdrawn) A method for generating billing information for each data service based on an analysis of packet data transmitted between a subscriber and a service server when the subscriber uses a wireless data service of a specific service server through a mobile communication network, comprising: (a) receiving user packet data transmitted between one of a mobile communication exchange and a packet controller and the service server, finding service information used by the subscriber through an analysis of the received user packet data, and outputting the service information as first billing information, the user packet data being reproduced by a packet repeater through a port mirroring method, the packet repeater repeating the packet data transmitted between one of the mobile communication exchange and the packet controller and the service server, and the mobile communication exchange and the packet controller providing a wireless data service to the subscriber; (b) combining the first billing information output in (a) and second billing information provided by the mobile communication exchange or the packet controller to store the combined information as single per-service billing

information; and (c) transmitting the subscriber's billing information which includes the per-service billing information to a specific billing process system so as to bill the subscriber.

43. (Withdrawn) The method of claim 42, wherein (a) comprises finding information including a destination IP and a port number for each subscriber through an analysis of the user packet data, and finding the subscriber's service usage information by using the packet data used by the subscriber.